Title (en)
Nuclear waste separator

Title (de)
Abtrenngerät für Nuklearabfall

Title (fr)
Séparateur de déchets nucléaires

Publication
EP 1039479 B1 20040901 (EN)

Application
EP 99302138 A 19990319

Priority
- EP 99302138 A 19990319
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- US 97054897 A 19971114

Abstract (en)
[origin: US5939029A] A method and system for separating radioactive waste containing volatiles, into light ions and heavy ions, includes a loader/ transporter for transferring the waste into a high vacuum environment in the chamber of a plasma processor. During this transfer, gases of the volatiles are released from the waste, collected in a holding tank, and subsequently ionized in the chamber. As the volatiles are ionized, the ions are directed by a magnetic field into contact with the waste to vaporize the waste. The waste vapors are then ionized in the plasma processor chamber to create a multi-species plasma which includes electrons, light ions and heavy ions. Within the chamber, the density of the multi-species plasma is established to be above its collision density in order to establish a substantially uniform velocity for all ions in the plasma. A nozzle accelerates the multi-species plasma to generate a fluid stream which is directed from the chamber toward an inertial separator. A magnetic field in the inertial separator effectively blocks electrons in the stream from entering the separator. On the other hand, the inertia of the various ions in the stream carry them into the separator where they are segregated into light ions and heavy ions according to their atomic weights. After segregation, the heavy ions are vitrified for subsequent disposal.

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